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Dr. Joseph Bredekamp
Senior Science Program Executive/Information Systems
Office of Space Science
NASA Headquarters, Code SR
Washington, DC 20546

Dear Dr. Bredekamp,

RE: Second year report and request for renewal of NASA AISRP grant NAG 5-11892: N-Chilada: A framework for parallel data analysis and visualization

Principle Investigator: Thomas Quinn

Co-Investigator: Laxmikant V. Kale

During the past year, we have continued the collaboration between the University of Washington "N-Body Shop", and the UIUC parallel programming laboratory. The goal was to integrate the prototype tools developed in the first year of the project into a minimally functional, but usable N-Chilada framework. That is, we endeavored to produce a package which we and our collaborators could start using for our scientific work.

The relevant tools we had previously developed included:

- A graphical user interface (GUI) written in JAVA.
- A tree based (that is, spatially organized) file format.
- A 3D particle visualizer implemented in parallel.
- A generic "tree class" with which we can implement our algorithms without worrying about details of the tree implementation.

During the summer we focused on usability, which in turn required a significant amount of integration of the above tools. In particular, the JAVA GUI was developed further so that common user tasks could be easily performed. E.g. selecting a simulation to view, selecting a color scheme to display, and viewing angle controls were added. A significant amount of coordination in developing the parallel visualization server was required during this process.

For example, the server needs to communicate to the client the available simulations and colormaps.

Another part of this integration process involved the file format. We layered meta-data in XML format on top of the file format we had previously developed. This allowed the server in an extensible fashion to query and relay to the user the quantities that are available for displaying. With this integration we now have a tool that has more capability than our current serial visualization package, TIPSY.

In October, Quinn and two graduate students (Lufkin and Stinson) traveled to UIUC to attend a CHARM++ workshop. We used this opportunity both to train another graduate student in the CHARM++ language and parallel programming techniques, and to coordinate with the Parallel Programing Lab group on our strategy for the coming year.

In November, Quinn and Stinson demonstrated our tools to colleagues at a meeting on Galaxy Formation. The goal was to get feedback from fellow scientists concerning usability and visualization needs. The feedback was unanimously positive. Plans are being made with these colleagues to use the package to visualize upcoming cutting edge simulations.

In December, we released an "internal alpha" version of our package, dubbed **Salsa**. Although it is not yet polished for general distribution, early adopters can obtain the package from `http://nchilada.astro.washington.edu/nchilada/bin/view/Code/SalsaPage`. With this release, members of the N-body group have started using **Salsa** on a regular basis to visualize/analyze their data.

Our goal for the next year is to increase the extensibility and functionality of this package. We are currently working with the UIUC group to incorporate a Python interpreter into the parallel server so that a user can interactively perform arbitrary manipulations of their data. We are planning to also incorporate non-data parallel operations into the server. Finally, as the project comes to a close, we will organize the package into a proper release for ease of adoption by the community.

In light of our progress, I request that this grant be renewed for a third year in the amount of \$151,830 for the period 6/1/04 to 5/31/05. The budget for spending this money is as given on the Third year budget form submitted with the original proposal.

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Sincerely,

Thomas Quinn

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